

# MRD Update

R. Napora

SciBooNE Collaboration Meeting

Sep, 14th 2006

# Table of Contents

- 1 The PMT Situation
- 2 Surveying the MRD Steel
- 3 Scheduling & Manpower
- 4 MRD Engineering Update

# The PMT Situation

We currently have 222 tubes in the glue pipeline, plus an addition ~20 on counters that are “under study”.

In addition to those in the pipeline we have

On hand: 60 EMI tubes (with +HV bases; now testable)  
9 Hamamatsu 10-stage tubes

We expect to beg/borrow/steal:

38 tubes from Kevin McFarland  
~70 tubes from Bob Bernstein/Tim Bolton

The target is 362, so if the “new” tubes don’t have a high failure rate (like the RCA 6342’s did) we should get there.

# Replacing the +HV Bases

We would like to pursue making new bases to replace +HV ones, if possible. The work would be done by technicians here at FNAL.

At present I do not have a cost estimate for this. If making new bases proves infeasible, however, we should be able to get by with the bases that we do have.

# Surveying the MRD Steel

# Surveying the Steel

To characterize the steel we need to know the **density** and **thickness** of the plates.

(As with most things in the MRD) the problem is that we are recycling our steel, not buying new plates made to our specifications.

We can weigh the plates and divide by their volume to get an average density of each plate. What we can't know with absolute certainty is how uniform the plate density is. (Unless we cut them up and test them—probably **not** a good idea.)

What we can do is **test the uniformity of one of the unused sister plates** from the boneyard.

The plan is to cut 20 steel plugs from different locations in the sister plate and measure their densities.

This should give us a good idea of how the density fluctuates within our steel (or, hopefully, confirm that the density is consistent throughout.)

We would also cross-check those measurements with the average densities measured for our steel plates. It would be nice if we could confirm that all of the sheets from E-605 were rolled in the same batch. That would build confidence that the sister sheet is a representative sample.



# Measuring the Thickness



To measure the thickness, we plan to use a **Panametrics 25DL Ultrasonic Gage**.

The gage measures the time difference between near and far reflected ultrasound waves and determines a thickness. **With proper calibration it is accurate to 0.0001" (0.001 mm).**

We would use two plugs from the sister plate to do the calibration.

# Scaling on the Plates

Something to be aware of:

There is **scaling** on the plates from when the steel was hot rolled (images to follow). Do we have to grind the plates down further?

This is doable, but it would take time and \$\$\$.



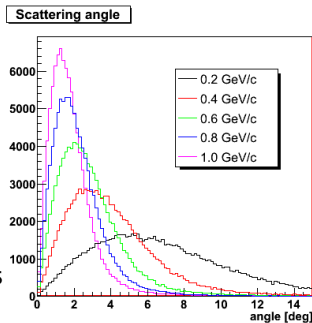




# Some things to consider:

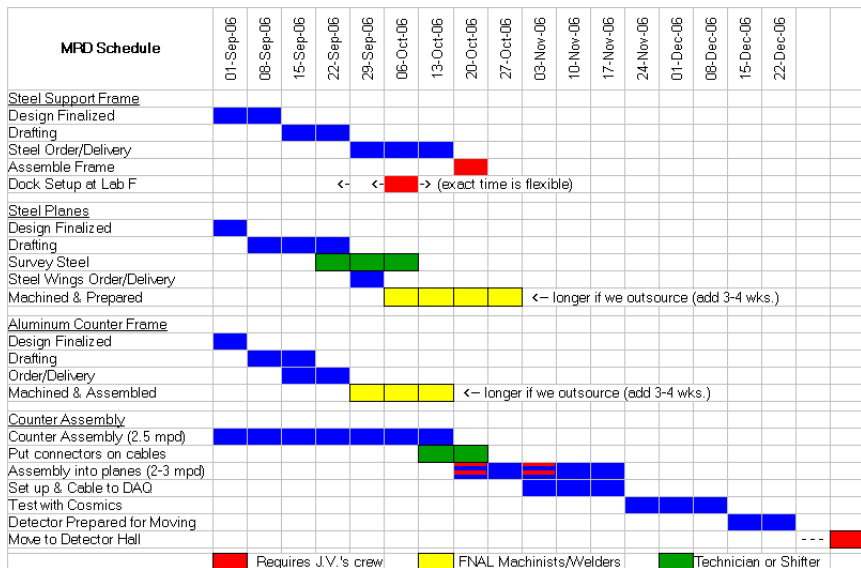
How many thickness measurements do we need to take per plane? (i.e. How close together should the survey points be?) More is generally better, but more measurements also take more time.

Will muon tracking resolution be good enough to take advantage of superfine survey information? (Low energy muons undergoing multiple scattering & 20cm wide tracking elements...)



Y. Nakajima

# Scheduling & Manpower

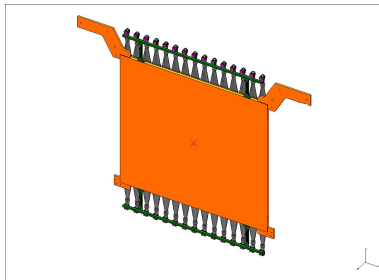
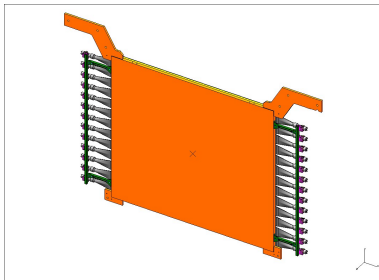




# MRD Engineering Update

# MRD Basic Layout

The basic layout of the MRD is still the same. There will be seven horizontal layers with 26 counters/layer, and six vertical layers with 30 counters/layer.



There have been two significant changes since the last collaboration meeting.

# Securing the Scintillator

The scintillator will now be **strapped** to the aluminum frame, rather than clamped under it.

## Advantages:

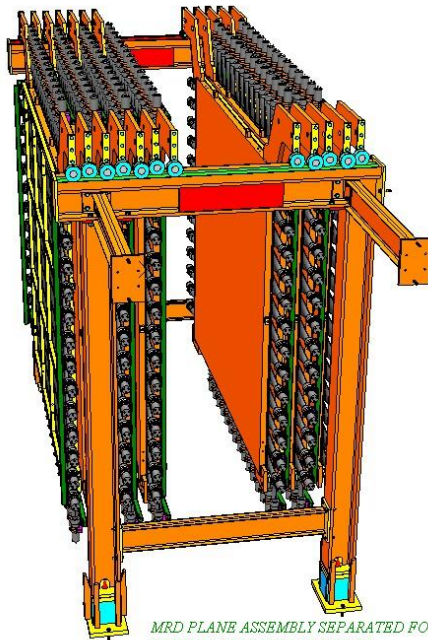
- less chance of scintillator crazing
- easier to align counters during assembly
- less fear of shifting during detector transport
- allows installation/removal of **single paddles...**
- ...**while frame is upright**

# Separating the MRD Layers

This last feature made another useful modification possible. The MRD planes will now be able to move independently, **allowing us to replace a counter in the detector hall.**

- Counters can still be replaced **after** installation
- It will be much easier to cable the bottom PMTs
- Assembly will be easier and safer for detector—we can hang the steel **before** instrumenting it.
- Solves problematic “double-plane” construction

Engineering was under political pressure to divert resources to Nova, and this modification almost didn't happen. Thanks go to **Ernie Villegas** for pushing this through for us!



*MRD PLANE ASSEMBLY SEPARATED FOR  
SCINTILLATOR REPLACEMENT*

